



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/707,837	11/08/2000	Kazuomi Sakatani	325772019900	9473

25227 7590 10/02/2003  
MORRISON & FOERSTER LLP  
1650 TYSONS BOULEVARD  
SUITE 300  
MCLEAN, VA 22102

EXAMINER
----------

SUKHAPHADHANA, CHRISTOPHER T

ART UNIT	PAPER NUMBER
----------	--------------

2625

DATE MAILED: 10/02/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/707,837

Applicant(s)

SAKATANI, KAZUOMI

Examiner

Christopher T. Sukhaphadhana

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

Art Unit: 2625

## DETAILED ACTION

### *Title*

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Image Error Diffusion Device with Noise Superposition.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claim 5** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. **Claim 5** recites the limitation "the noise overlaid input image" in lines 4-5 of the claim. There is insufficient antecedent basis for this limitation in the claim. Consider replacing "overlaid" with --superimposed-- or changing "superimposing" of the previous line to --overlaying--.

### *Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Art Unit: 2625

6. As best interpreted in light of the 35 USC 112, second paragraph rejection above, **claims 1-9** are rejected under 35 U.S.C. 102(a) as being anticipated by Lau et al (*Digital color halftoning with generalized error diffusion and multichannel green-noise masks*, May 2000, newly cited, "Lau").

7. In regards to **claim 1**, Lau discloses an image processing apparatus (Fig 5), comprising: an error adding unit (leftmost  $\Sigma$ , Fig 5) for correcting the color value of each pixel of an input image in accordance with an error data; an output color selector ( $T(\cdot)$ , Fig 5) for converting the color corrected by the error adding unit to a single color selected from among a plurality of outputtable colors of the image processing apparatus; an error calculator (B, A, and H, Fig 5) for generating the error data for diffusing the color error converted by the output color selector to pixels peripheral to a target pixel, and contributing (both leftmost  $\Sigma$ , Fig 5) the error data to the error adding unit; and a noise overlay unit for superimposing noise on the input image and provided as a front stage to the error adding unit (page 927, col 2, section C. Simulations, middle of first paragraph).

8. In regards to **claim 2**, Lau further discloses in equation 23, page 927, the color of each pixel of an input image corrected by vector error diffusion method. Note that the components of eq 23 are vectors.

9. In regards to **claim 3**, Lau further discloses in page 927, col 2, section C. Simulations, first paragraph, the noise being color data having relation to the colorimetric value of each outputtable color.

Art Unit: 2625

10. In regards to **claim 4**, Lau further discloses in page 927, col 2, section C. Simulations, latter part of first paragraph, the noise being color data having relation to the colorimetric value of each outputtable color. Note especially that *mean* = 0 for the low-level white noise.

11. In regards to **claims 5-6**, all the elements set forth in this claim have been addressed in the argument of claim 1.

12. In regards to **claims 7-9**, all the elements set forth in this claim have been addressed in the argument of claims 2-4, respectively.

13. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. **Claims 1-3, 5-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sullivan et al (U.S. Patent 5,070,413, newly cited, "Sullivan") in combination with Shiau et al (U.S. Patent 5,880,857, newly cited, "Shiau").

16. In regards to **claim 1**, Sullivan discloses an image processing apparatus (Fig 5), comprising: an error adding unit (ref no 22, Fig 5) for correcting the color value of each pixel of an input image in accordance with an error data; an output color selector (ref no 24, Fig 5) for

Art Unit: 2625

converting the color corrected by the error adding unit to a single color selected from among a plurality of outputtable colors of the image processing apparatus; an error calculator (ref no 24, Fig 5) for generating the error data for diffusing (Fig 6) the color error converted by the output color selector to pixels peripheral to a target pixel, and contributing (ref no 30, Fig 5) the error data to the error adding unit.

Sullivan does not expressly teach a noise overlay unit for superimposing noise on the input image and provided as a front stage to the error adding unit.

Shiau teaches the noise overlay unit as claimed (Fig 2 and ref no S2, Fig 7). Note how S2 comes prior to S5, S7, and S8, the error calculators and error distributor, respectively.

Furthermore, while Shiau teaches the invention towards multi-level grey signals, the concepts of this invention are readily applicable to a color environment (col 9, lines 29-34).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Shiau's noise overlay unit as a front stage to Sullivan's error adding unit because Shiau's invention provides a process for eliminating pattern shifting artifacts by perturbing the threshold/image signal relationship (Shiau, col 9, lines 35-37).

17. In regards to **claim 2**, Sullivan further discloses in col 4, line 65, the color of each pixel of an input image is corrected by vector error diffusion method.

18. In regards to **claim 3**, Shiau further discloses in col 3, lines 62-64, the noise is color data having relation to the colorimetric value of each outputtable color. While Shiau discloses the noise according to grey level, one of ordinary skill in the art would be able to regard the grey level in terms of color, in light of Shiau, col 9, lines 29-34.

Art Unit: 2625

19. In regards to **claims 5-6**, all the elements set forth in this claim have been addressed in the argument of claim 1.

20. In regards to **claim 7-8**, all the elements set forth in this claim have been addressed in the argument of claims 2-3 respectively.

21. **Claim 4 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sullivan et al (U.S. Patent 5,070,413, cited above, "Sullivan") in combination with Shiau et al (U.S. Patent 5,880,857, cited above, "Shiau") as applied to claim 1 above, in further combination with Kaburagi et al (U.S. Patent 5,805,738, newly cited, "Kaburagi").

22. In regards to **claim 4**, Sullivan and Shiau do not expressly disclose the noise being selected so that the total sum of relative amount of overlay noise is zero relative to the colorimetric value of each outputtable color.

Kaburagi teaches the above limitation (Fig 20 and col 17, lines 17-36). Note that in this instance, a pair of positive and negative random numbers (having equal absolute values, col 19, line 39) are added to two pixels in a four pixel period as shown in Fig 20 and in col 17, lines 27-31. This number pairing brings the sum of the relative amount of overlay noise relative to the colorimetric value of each outputtable color to zero.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kaburagi's teachings into Shiau and Sullivan's apparatus because the arrangement for adding positive and negative random numbers at every other pixel positions can suppress granular noise (Kaburagi, col 17, lines 37-40) Furthermore, Shiau does not expressly disclose a

Art Unit: 2625

particular or preferred random number generator or method of perturbing the input video signal.

Kaburagi contributes one possible inner working of such.

23. In regards to **claim 9**, all the elements set forth in this claim have been addressed in the argument of claim 4.

### ***Conclusion***

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

**Mamoru Maeda** (JP 10-155087) discloses an image processor with an error spread section where a pseudo contour is made unremarkable by increasing a random number in a smooth image area with a small edge and decreasing a random number in a rugged image area with a large edge quantity in the random number conversion.

**Kishimoto et al** (*Improved Error Diffusion Modified with AM/FM Periodic Noise*, Oct 1999) discloses a modified ED algorithm employing a periodic noise whose amplitude is controlled to be higher in the highlight and shadow, while lower in the midtone areas.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher T. Sukhaphadhana whose telephone number is 703-306-4148. The examiner can normally be reached on 9a-4p M-F.

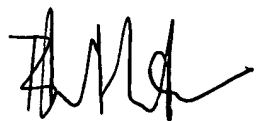
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.



Art Unit: 2625

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

CTS  
CTS

  
**BHAVESH M. MEHTA**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**